Combining Rule Learning and Nonmonotonic Reasoning for Link Prediction in Knowledge Graph

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1. Motivation

- Knowledge Graphs: huge collections of positive unary and binary facts treated under Open World Assumption

- Automatically constructed, thus incomplete/inaccurate

- Horn rule mining to clean KGs e.g., [Galárraga et al., 2015]

- But: exceptions are not captured by Horn rules, thus erroneous predictions

2. Quality-based Horn Theory Revision

Given:
- Knowledge Graph
- Set of Horn rules

Find:
- Nonmonotonic rules revision, s.t.
  - average conviction is maximized
    \[ \text{conv}(r, KG) = \frac{1}{1 - \text{supp}(r, KG)} \]
  - number of conflicting predictions is minimized

3. Approach Overview

4. (Ab)normal Substitutions and Exception Candidates

5. Exception Ranking

6. Experiments

7. Further Work

References


